Space Weather Forecast

Issued on Tuesday, 23 April 2024 at 01:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate flares expected (R1/R2 blackouts). Slight chance of isolated Minor Geomagnetic Storm intervals throughout from peripheral coronal mass ejection effects.

IMPORTANT NOTICE: On the 23rd of April between 1500 UTC and 2100 UTC, a significant data outage at NOAA SWPC is expected which will impact most of our observational data feeds and some models. We may receive data intermittently through that period. MOSWOC service will continue on contingency. Alerts and warnings will be sent using alternative data, if available. The planned data outage may be postponed in the event of significant space weather.

Solar Activity: Moderate solar activity observed with several Moderate flares. Fifteen sunspot regions feature on the visible side of the solar disc. This includes a broad complex in the southwest. This region carries the majority of current flare risk, with the spots magnetically connected and complex in places. Several other regions are also moderately sized, but remain more stable. Several areas in the southeast remain small, but some developments continue to be observed.

No clearly Earth directed coronal mass ejections (CMEs) observed in available imagery although analysis continues into a recent CME associated with a moderate flare from the large sunspot complex in the southwest at 22/2116UTC.

Solar Wind / Geomagnetic Activity: Solar winds were slightly elevated throughout, on a slowly declining trend, ending the period at around 400km/s. The Interplanetary Magnetic Field (IMF) Bt, was weak, with the important north-south component, Bz, varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Occasional Moderate flares are expected to continue, with a slight chance of isolated Strong flares. The greatest risk from the large complex of sunspot regions in the southwest.

Solar Wind / Geomagnetic Activity: There are several Coronal Mass Ejections that have been modelled and are anticipated to pass close to Earth through the period, with the potential glancing interactions. This gives low confidence for detail of the geomagnetic forecast. The slightly elevated solar wind from a coronal hole is likely to gradually decline towards Slow levels in coming days. A further enhancement possible by day 4 (26 Apr) in association with another coronal hole currently near centre disk, perhaps seeing winds increasing back towards slightly elevated or elevated levels.

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Overall, geomagnetic activity starting Quiet to Unsettled at first, but declining to mainly Quiet with isolated Unsettled intervals into day 1 (23 Apr). Any CME arrivals however, will give a chance of further isolated Active intervals and a slight chance of G1 Minor Storms. Activity perhaps more generally increasing by day 4 (26 Apr) with Unsettled to Active conditions expected by the end of the period given faster wind influence.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to persist at background, but with a chance of rising with any larger flares that occur. This will bring a slight chance of reaching the S1 Solar Radiation Storm levels throughout the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	15	15
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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